

## AMENDMENTS TO THE CLAIMS

### Claims 1-21 (Cancelled)

22. (New) A olefin polymerization catalyst composition comprising a metallocene catalyst component characterized by the formula:



wherein:

(a)  $Cp^1$  and  $Cp^2$  are each independently a substituted or unsubstituted cyclopentadienyl derivative incorporating a cyclopentadienyl ring in the form of a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of the cyclopentadienyl derivatives  $Cp^1$  and  $Cp^2$  incorporate a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring;

(b)  $R''$  is a structural bridge between  $Cp^1$  and  $Cp^2$  imparting stereorrigidity to the ligand structure provided that when  $Cp^1$  incorporates a phosphorus atom in its cyclopentadienyl ring and  $Cp^2$  is free of a phosphorus atom in its cyclopentadienyl ring, the bridge  $R''$  is connected to the phosphorus atom in  $Cp^1$  or to a carbon atom in  $Cp^1$  which is distal to the phosphorus atom and further provided that when  $Cp^1$  is a substituted or unsubstituted indenyl group and  $Cp^2$  is a substituted or unsubstituted indolyl group, the bridge  $R''$  is connected to the nitrogen atom of group  $Cp^2$  or to a carbon atom which is vicinal to the nitrogen atom;

(c) M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version);

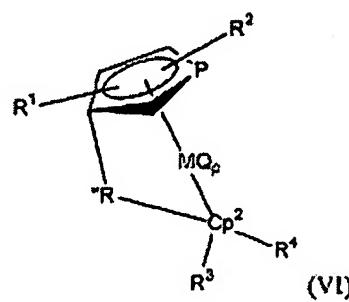
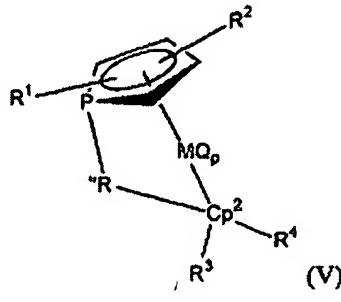
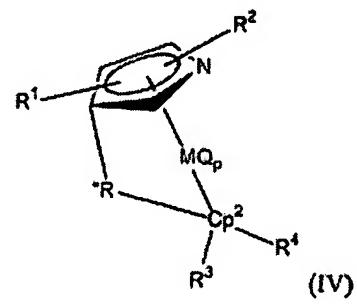
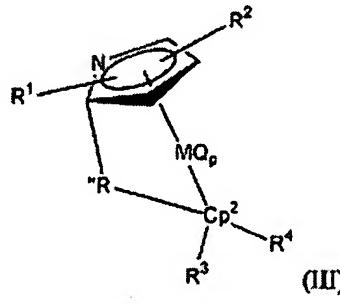
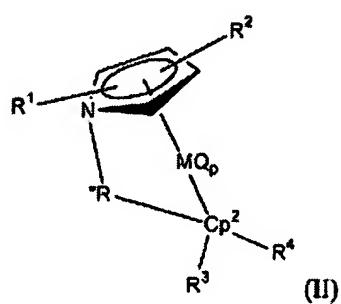
(d) Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms; and

(e) p is equal to the valence of the transition metal M minus 2.

23. (New) The composition of claim 22 wherein one of  $Cp^1$  or  $Cp^2$  incorporates a nitrogen atom in its cyclopentadienyl ring, and  $R''$  is attached to the nitrogen atom, to a carbon atom vicinal to the nitrogen atom, or to a carbon atom non-vicinal to the nitrogen atom.

24. (New) The composition of claim 22 in which  $Cp^1$  and  $Cp^2$  are each independently a substituted or unsubstituted cyclopentadienyl group, or a substituted or unsubstituted fluorenyl group.

25. (New) The composition of claim 22 wherein the catalyst component is characterized by one of the following formulas (II) – (VI):



wherein  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  may be the same or different and are selected from the group consisting of a halogen and  $C_1 - C_{20}$  alkyl, aryl, cycloalkyl, alkoxy and silanyl groups.

26. (New) The composition of claim 22 wherein Cp<sup>1</sup> is a substituted or unsubstituted cyclopentadienyl group and Cp<sup>2</sup> is a substituted or unsubstituted fluorenyl group.

27. (New) The composition of claim 22 wherein both Cp<sup>1</sup> and Cp<sup>2</sup> comprise indenyl groups.

28. (New) The composition of claim 22 wherein M is Ti, Zr, Hf, or V.

29. (New) The composition of claim 28 wherein p is 2.

30. (New) The composition of claim 29 wherein Q is Cl.

31. (New) The composition of claim 22 wherein R" is substituted or unsubstituted and is selected from the group consisting of an alkylene derivative having from 1-20 carbon atoms, a dialkyl germanium derivative, a dialkyl silicon derivative, a dialkyl siloxane derivative, an alkyl phosphine derivative and an amine derivative.

32. (New) The catalyst of claim 31 wherein R" comprises an Me<sub>2</sub>Si derivative or an Et derivative.

33. (New) The catalyst of claim 22 wherein at least one of the Cp<sup>1</sup> and Cp<sup>2</sup> derivatives are substituted with substituents which are independently selected from the group consisting of aryl derivatives having from 1-20 carbon atoms, hydrocarbyl derivatives having from 1-20 carbon atoms, cycloalkyl derivatives, silane derivatives, alkoxy derivatives and halogens.

34. (New) The composition of claim 33 wherein said substituents are independently selected from the group consisting of Ph, Bz, Naph, Ind, BzInd, Me, Et, n-Pr, i-Pr, n-Bu, and Me<sub>2</sub>Si.

35. (New) The composition of claim 34 wherein the substituents are methyl groups.

36. (New) The composition of claim 22 wherein the metallocene catalyst component is immobilized on a solid support.

37. (New) The composition of claim 22 further comprising an aluminum- or boron-containing co-catalyst capable of activating the catalyst component.

38. (New) The composition of claim 22 wherein Cp<sup>1</sup> incorporates a nitrogen or phosphorus atom and is a cyclopentadienyl group or an indenyl group which is substituted or unsubstituted and Cp<sup>2</sup> is a substituted or unsubstituted fluorenyl group.

39. (New) The composition of claim 38 wherein Cp<sup>1</sup> is a substituted or unsubstituted cyclopentadienyl group and Cp<sup>2</sup> is a fluorenyl group with at least one substituent at the 3- or 6-position, or at the 2- or 7-position.

40. (New) The composition of claim 39 wherein said fluorenyl group is disubstituted with substituents at the 3- and 6-positions or at the 2- and 7-positions.

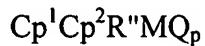
41. (New) The composition of claim 40 wherein said substituents are methyl groups.

42. (New) The composition of claim 22 wherein said catalyst component is selected from the group consisting of: Me<sub>2</sub>Si(pyrrolyl)FluZrCl<sub>2</sub>, Et(pyrrolyl)FluZrCl<sub>2</sub>,

$\text{Me}_2\text{Si(Imidazolyl)FluZrCl}_2$ ,     $\text{Et(Imidazolyl)FluZrCl}_2$ ,     $\text{Me}_2\text{Si(phospholyl)FluZrCl}_2$ ,    and  
 $\text{Et(phospholyl)FluZrCl}_2$ .

43. (New) A process for the polymerization of an ethylenically unsaturated monomer comprising:

(a) providing a metallocene catalyst component characterized by the formula:



wherein:

(i)  $Cp^1$  and  $Cp^2$  are each independently a substituted or unsubstituted cyclopentadienyl derivative incorporating a cyclopentadienyl ring in the form of a substituted or unsubstituted cyclopentadienyl group, a substituted or unsubstituted indenyl group or a substituted or unsubstituted fluorenyl group wherein at least one of the cyclopentadienyl derivatives  $Cp^1$  and  $Cp^2$  incorporate a nitrogen (N) or phosphorus (P) atom in its cyclopentadienyl ring;

(ii)  $R''$  is a structural bridge between  $Cp^1$  and  $Cp^2$  imparting stereorigidity to the ligand structure provided that when  $Cp^1$  incorporates a phosphorus atom in its cyclopentadienyl ring and  $Cp^2$  is free of a phosphorus atom in its cyclopentadienyl ring, the bridge  $R''$  is connected to the phosphorus atom in  $Cp^1$  or to a carbon atom in  $Cp^1$  which is distal to the phosphorus atom and further provided that when  $Cp^1$  is a substituted or unsubstituted indenyl group and  $Cp^2$  is a substituted or unsubstituted indolyl group, the bridge  $R''$  is connected to the nitrogen atom of group  $Cp^2$  or to a carbon atom which is vicinal to the nitrogen atom;

(iii) M is a transition metal from Group IIIB, Group IVB, Group VB or Group VIB of the Periodic Table of Elements (CAS Version);

(iv) Q is a halogen or a hydrocarbyl group having from 1-20 carbon atoms; and

(v) p is equal to the valence of the transition metal M minus 2;

- (b) providing an activating co-catalyst component;
- (c) contacting said metallocene catalyst component and said activating co-catalyst component in a polymerization reaction zone with an ethylenically unsaturated monomer to produce a polymer product by the polymerization of said monomer; and
- (d) recovering said polymer product from said reaction zone.

44. **(New)** The method of claim 43 wherein said ethylenically unsaturated monomer is ethylene or propylene.

45. **(New)** The method of claim 44 wherein said monomer comprises propylene and said polymer product is a polypropylene homopolymer or copolymer.

46. **(New)** The method of claim 44 wherein said monomer comprises propylene and said polymer product is a stereoregular polypropylene comprising isotactic and syndiotactic polymer blocks.